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The Fauna of the *Siphonalia sutterensis* Zone  
in the Roseburg Quadrangle, Oregon

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INTRODUCTION.

A definite connecting link between the Tejon group of Oregon and that of California appears to be present in the uppermost portion of the Umpqua formation on the Umpqua River near the mouth of Little River. The fauna upon which this correlation is based was obtained by Mr. Bruce Martin, until recently Assistant Curator of Paleontology of the California Academy of Sciences.

The *Siphonalia sutterensis* Zone of California is found typically at the Marysville Buttes.<sup>1</sup> Other localities where it has been recognized also are at Oroville<sup>2</sup> beneath the Older Basalt of Oroville, South Table Mountain, and near Ione<sup>3</sup>, Amador County, California, and near Merced Falls, Merced County, California.

In all of these localities this zone of the Tejon group is the only one present, the lower portion of the Tejon being absent. The beds at the Marysville Buttes containing the *Siphonalia sutterensis* fauna rest directly upon rocks of Chico-Cretaceous

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<sup>1</sup> Dickerson, R. E., Fauna of the Eocene at Marysville Buttes, California, Univ. Calif. Publ., Bull. Dept. Geol., vol. 7, pp. 287-298, 1913.

<sup>2</sup> Dickerson, R. E., Note on the Faunal Zones of the Tejon group, Univ. Calif. Publ., Bull. Dept. Geol., vol. 8, pp. 17-25, 1914.

<sup>3</sup> Dickerson, R. E., The Ione Formation of the Sierra Nevada Foothills, A Local Facies of the Upper Tejon-Eocene, Science, New Series, vol. 40, pp. 67-70, 1914.

age. The beds at Oroville were laid down upon the Basement Complex of the Sierra Nevada and the Chico. The so-called Ione formation, a local facies of the Tejon group which occurs typically at Ione and at Merced Falls, rests unconformably upon the Mariposa slates and other members of the Basement Complex.

At the Oregon locality, however, a great thickness of ten thousand feet of Tejon strata lies below the beds which yielded the fauna described in this paper. The writer's previous conclusions from a study of the *Siphonalia sutterensis* fauna were based upon stage of evolution, identity of a few species whose ranges were limited to the uppermost beds in the Tejon in the San Francisco Bay region, and the absence of many species which were characteristic of the lower zones of the Tejon. The recognition of the *Siphonalia sutterensis* fauna in Oregon gives stratigraphic confirmation concerning the position of this fauna in the Eocene time scale of the Pacific Coast; i. e., the *Siphonalia sutterensis* Zone is the youngest Eocene thus far recognized on the Pacific Coast.

#### STRATIGRAPHY.

The stratigraphic relations at the two collection points are described by Martin as follows: "The beds at locality 24 dip east at a low angle. The strike is nearly north and south. The rock at this locality is a massive, blue-gray sandstone overlaid by shale." At locality 25, Martin observed a dip of 20° East and a strike of North 10° East.

Mr. Diller, in the Roseburg Folio, describes this section as follows: "The Umpqua is by far the thickest formation in the Roseburg Quadrangle, but, on account of the lack of good exposures of certain members of the series, the whole could not be accurately measured. The best outcrops are along the Little River, where a continuous section of a portion of the series is well exposed. This portion has a thickness of about 7500 feet. It is interrupted on the northwest by the large mass of diabase, beyond which, as shown in Section B, about 4500 feet of still lower beds are seen, making a total thickness of approximately 12,000 feet for the entire exposed formation. It increases in thickness to the northwest and has wide distribution throughout the Coast Range." Diller's Section B places the localities described above about 2000 feet below the top of the Tejon.

## FAUNAL RELATIONS.

The fauna obtained at these two localities is as follows:

## LIST OF FOSSILS FROM THE UMPQUA FORMATION.

	25	24
<i>Barbatia morsei</i> Gabb.....		×
<i>Cardium marysvillensis</i> Dickerson.....	×	
<i>Cardium breweri</i> Gabb.....	×	×
<i>Crassatellites semidentata</i> Cooper.....	×	×
<i>Crassatellites washingtoniana</i> Weaver.....	×	×
<i>Corbula parilis</i> Gabb.....	×	
<i>Corbula hornii</i> Gabb.....		×
<i>Dosinia</i> , species.....		×
<i>Glycimeris sagitata</i> Gabb.....	×	
<i>Glycimeris eocenica</i> Weaver.....	×	
<i>Lucina</i> (?) <i>cretacea</i> Gabb.....		×
<i>Modiolus ornatus</i> (Gabb).....	×	
<i>Meretrix hornii</i> Gabb.....	×	×
<i>Meretrix ovalis</i> Gabb.....	×	
<i>Macrocallista conradiana</i> (Gabb).....	×	
<i>Psammobia æqualis</i> (Gabb).....	×	
<i>Pitaria martini</i> , new species.....		×
<i>Ostrea idriaensis</i> Gabb.....	×	×
<i>Tivela weaveri</i> , new species.....	×	×
<i>Venericardia planicosta merriami</i> , new subspecies.....	×	×
<i>Venus aequalateralis</i> Gabb.....	×	
<i>Amauroopsis andersoni</i> , new species.....		×
<i>Amauroopsis alveata</i> Gabb.....	×	×
<i>Amauroopsis umpquaensis</i> , new species.....	×	×
<i>Ancilla</i> (Oliverato) <i>californica</i> Cooper.....	×	
<i>Caricella stormsiana</i> Dickerson.....	×	
<i>Cerithiopsis alternata</i> Gabb.....	×	
<i>Cassidaria tuberculata</i> (Gabb).....	×	
<i>Clavella</i> , species.....	×	
<i>Calyptrea excentrica</i> (Gabb).....	×	×
<i>Cylichna costata</i> Gabb.....	×	×
<i>Chrysodomus martini</i> Dickerson.....	×	
<i>Dentalium</i> , species.....	×	
<i>Ficopsis remondii</i> Gabb.....	×	
<i>Ficopsis cooperi</i> Gabb.....	×	
<i>Loxotrema turruta</i> Gabb.....	×	×
<i>Natica hannibali</i> , new species.....	×	
<i>Neverita nuciformis</i> Gabb.....	×	
<i>Neverita secta</i> Gabb.....	×	×
<i>Neverita globosa</i> Gabb.....		×
<i>Olivella mathewsonii</i> Gabb.....	×	×
<i>Potamides carbonicola</i> Cooper.....	×	×
<i>Pseudoliva dilleri</i> , new species.....	×	×
<i>Rimella canalifera</i> Gabb.....	×	
<i>Siphonalia sutterensis</i> Dickerson.....		×
<i>Surcula davisiana</i> (Cooper).....	×	
<i>Tritonium hornii</i> Gabb.....		×
<i>Turritella uwasana</i> Gabb.....	×	×
<i>Turritella merriami</i> Dickerson.....	×	
<i>Turris suturalis</i> (Cooper).....	×	

Several forms in this fauna have not been previously reported from any other localities except those of the Marysville Buttes and Oroville South Table Mountain. These species are as follows: *Chrysodomus martini*, *Cardium marysvillensis*, *Siphonalia sutterensis*, *Cariçella stormsiana*, *Surcula davisiana*, and *Venericardia planicosta merriami*, new subspecies. In addition to these species, *Ancilla (Oliverato) californica*, *Turris suturalis* and *Neverita globosa*, while not restricted to the *Siphonalia sutterensis* Zone of the Tejon group of California, are quite characteristic and abundant in this zone. The other species, except the new ones listed, have a great range in the Tejon of California and most of them are found throughout its entire thickness. *Amauopsis alveata*, *Rimella canalifera*, and *Turritella uvasana*, have not as yet been reported from the *Siphonalia sutterensis* Zone of the Marysville Buttes. These three species are very common forms in the portion of the Tejon below the *Siphonalia sutterensis* Zone. The occurrence of these forms along with the characteristic forms of the *Siphonalia sutterensis* Zone determines the position of the strata containing this fauna in reference to the faunal zones of the Tejon group of California. The fauna seems to present a stage of development between that of Zone 3 of the Diablo region and the fauna of the *Siphonalia sutterensis* Zone of the Marysville Buttes. The fauna obtained from the uppermost portion of the Umpqua formation appears to be more closely related to the *Siphonalia sutterensis* Zone than to the fauna of Zone 3, and on this account, it is tentatively placed as the lowermost portion of the *Siphonalia sutterensis* Zone.

Locality 24 is situated on the east bank of the north fork of the Umpqua. It is near the bend of the river, one-quarter of a mile north of Glide postoffice. It is in the southwest quarter of Sec. 18, T. 26 S., R. 3 W.

Locality 25 is on the east bank of the Little River, and underneath the bridge which crosses it at its mouth. It is near the center of Sec. 19, T. 26 S., R. 3 W.

## PITARIA MARTINI, new species.

Plate 11, figures 2a, 2b, 2c.

Shell of moderate size; elongate, with beaks slightly anterior of the center; anterior dorsal margin somewhat concave; the slightly convex posterior dorsal margin sloping less steeply than the anterior margin; anterior end sharply rounded; posterior end narrowly rounded; ventral margin convex, fluted; a marked umbonal ridge extending to a point on the ventral margin two-fifths of the distance from the posterior end; a shallow groove running posteriorly, and parallel to the umbonal ridge; lunule long, narrow; escutcheon indistinct.

Dimensions: Height, 32mm; length, 42mm.

Type:—No. 237, and cotype, No. 238, California Academy of Sciences. Locality 25, Roseburg Quadrangle, Oregon, near the center of Sec. 19, T. 26 S., R. 3 W., on the east bank of Little River at its confluence with the Umpqua, underneath the bridge at that point.

Named for Mr. Bruce Martin, sometime Assistant Curator of Paleontology, California Academy of Sciences.

## TIVELA WEAVERI, new species.

Plate 11, figures 3a, 3b, 3c.

Shell trigonal, with beak central, equivalve; the nearly straight anterior margin sloping steeply to a narrowly rounded anterior end; the slightly convex posterior margin sloping almost as steeply as the anterior; posterior end rounded broadly; base broadly rounded; hinge of right valve exhibiting three strong cardinals and a socket for a lateral in the anterior portion of hinge plate; pallial sinus appearing to be a small V-shaped one; lunule and escutcheon indistinct.

Dimensions: Height, 29mm; width, 31mm.

This species resembles *Crassatellites grandis* (Gabb) in general form. Its shell and hinge plate are not nearly so heavy as those of *C. grandis*. Common at localities 24 and 25.

Type:—No. 239, and cotype, No. 240, Cal. Acad. Sci. Locality 25, Roseburg Quadrangle, Oregon, near the center of Sec. 19, T. 26 S., R. 3 W., on the east bank of Little River at its confluence with the Umpqua, underneath the bridge at that point.

Named in honor of Professor Charles E. Weaver of the University of Washington.

## VENERICARDIA PLANICOSTA MERRIAMI, new subspecies.

Plate 11, figures 1a and 1b.

This subspecies of *V. planicosta* is apparently the end member of an evolutionary series which begins with the typical *V. planicosta* in the Martinez, the Lower Eocene group of California. The middle member is *V. planicosta hornii* (Gabb) of the lower Tejon. This form in the adult stage lacks the marked radial ribbing of *V. planicosta hornii* (Gabb), and it is in general a higher form as well. The concentric ribbing of this form is much stronger than that of the lower Tejon subspecies. Young individuals, however, resemble the lower Tejon form so closely that one is not warranted in recognizing the subspecies upon the basis of the immature forms.

Dimensions: Height, 70mm; length, 70mm.

This subspecies resembles *V. potapacoensis* Clark & Martin, of the Maryland Eocene in that the radial ribbing in both forms is becoming obsolescent. They appear to differ in shape, however. The type, which is figured, is an extreme case of lack of radial ribbing. Other specimens associated with it at the same locality show fairly distinct ribbing in the neighborhood of the umbones. This species is one of the most characteristic forms of the *Siphonalia sutterensis* Zone. It occurs abundantly but poorly preserved at a University of California locality eight miles south of Ione, Amador County, California, at the O'Neill Sandstone Quarry, Sec. 27, T. 5 N., R. 10 E., Mt. Diablo B. L. and M., in strata which were previously recognized as Ione. It is associated at this place with *Meretrix hornii* Gabb, *Turritella merriami* Dickerson, and a few other species. This fauna proves the Ione to be only a facies of the Tejon Eocene.

Type:—No. 241, and cotype, No. 242, Cal. Acad. Sci. Locality 25, Roseburg Quadrangle, Oregon, near the center of Sec. 19, T. 26 S., R. 3 W., on the east bank of Little River, at its confluence with the Umpqua, underneath the bridge at that point.

Named in honor of Professor J. C. Merriam of the University of California.

## NATICA HANNIBALI, new species.

Plate 12, figures 5a and 5b.

Shell large, with low, partially immersed spire and very large subquadrate body-whorl; whorls five or six in number, the penultimate whorl partially covered by body-whorl; upper portion of body-whorl and the penultimate whorl forming a somewhat flattened surface above which the small spire rises abruptly; sides of spire-whorls only slightly convex and sloping away from the immersed linear suture with a uniform angle; the portion of the body-whorl near the suture rising above the suture and forming a distinct ridge; the portion of the whorl a short distance below this ridge concave, making a groove similar to that of the genus *Gyrodes*; a marked swelling below this groove making a shoulder about a third of the whorl length below the suture; anterior two-thirds of body-whorl only slightly convex; peculiar incremental lines mark the body-whorl and further emphasize its peculiarities; these lines bowed forward in the vicinity of the groove and outward on the lower portion of the whorl; outer lip simple; inner lip incrustated by a thin callus which completely covers the umbilicus, which is continuous with the outer lip; mouth very narrow anteriorly but very broad near the base.

Dimensions: Length, 42mm; width of body-whorl, 35mm.

This species also occurs in the Tejon of Rose Canyon, San Diego County, California, and in the Tejon about ten miles north of Coalinga, California. Its very characteristic shape renders it easy of identification.

Type:—No. 243, Cal. Acad. Sci. Locality 25, Roseburg Quadrangle, Oregon, near the center of Sec. 19, T. 26 S., R. 3 W., on the east bank of Little River at its confluence with the Umpqua, underneath the bridge at that point. Coll., F. M. Anderson.

Named for Mr. Harold Hannibal, whose collections have added greatly to our knowledge of the Tertiary Paleontology of Oregon and Washington.

## AMAUROPSIS ANDERSONI, new species.

Plate 12, figures 2a and 2b.

Shell of medium size, solid, thick, moderately elevated, smooth except for growth-lines, with five whorls; spire-whorls rounded, their upper half being slightly tabulate, this tabulation better marked on the body-whorl but none of the specimens has this feature as well developed as *Amatropsis alveata* (Conrad). The general dimensions are about the same as in *A. alveata*, though the width in most specimens is slightly greater. The body-whorl is decidedly globose with semilunar mouth; outer lip simple; inner lip slightly incrustated and nearly covering a small narrow umbilicus.

Dimensions: Length, 27mm; width of body-whorl, 25mm.

This species resembles *Amatropsis oviformis* (Gabb) in general outline but its umbilicus is much narrower and its spire-whorls less rounded than in that species.

Type:—No. 244, Cal. Acad. Sci. Locality 25, Roseburg Quadrangle, Oregon, near the center of Sec. 19, T. 26 S., R. 3 W., on the east bank of Little River at its confluence with the Umpqua, underneath the bridge at that point. Coll., Bruce Martin.

Named for Mr. F. M. Anderson, Curator of the Department of Invertebrate Paleontology, California Academy of Sciences, who made extensive collections from the region with which this paper deals.

## AMAUROPSIS UMPQUAËNSIS, new species.

Plate 12, figures 3a and 3b.

Shell large, solid, thick, much elevated, smooth except for incremental lines, with six or seven whorls; spire-whorls rounded and their upper third somewhat tabulated. This species is much longer than *A. andersoni* Dickerson or *A. alveata* Gabb, and the spire is much higher; body-whorl longer than the width; outer lip simple, with a marked shouldering at linear impressed suture; inner lip covered by a thin callus which nearly covers a small narrow umbilicus.

Dimensions: Length, 41mm; width of body-whorl, 33mm.

Type:—No. 245, Cal. Acad. Sci. Locality 25, Roseburg Quadrangle, Oregon, near the center of Sec. 19, T. 26. S.,



R. 3. W., on the east bank of Little River at its confluence with the Umpqua, underneath the bridge at that point. Coll., Bruce Martin.

Named for the type locality of the species.

CERITHIOPSIS OREGONENSIS, new species.

Plate 11, figures 5a and 5b.

Shell elongate conic; upper whorls missing; remaining whorls, except the body-whorl, marked by three strong, equally spaced spiral lines of same strength crossed by axial ribs, the crossing being marked by rounded nodes; a very fine thread found between the spiral lines; suture impressed, linear; body-whorl marked by four rows of nodes instead of three, as in the spire-whorls, the last row being weaker than the others; fine threads between these spiral lines; base marked by four or five nodose spiral lines and threads, the spiral lines being smaller than those on rest of whorl; aperture ovate-quadrate, with narrow anterior sinus; outer lip thin; canal twisted.

Dimensions; Length of broken type, 20mm; width of body-whorl, 4.5mm.

This species resembles *C. alternata* Gabb in shape, but its whorls are nearly flat while those of *C. alternata* are decidedly convex. The nodes are much stronger than on *C. alternata*. It differs from *C. excelsus* Dall in that its whorls are nearly flat and its spiral lines less numerous and larger.

Type:—No. 246, -Cal. Acad. Sci. Locality 25, Roseburg Quadrangle, Oregon, near the center of Sec. 19, T. 26 S., R. 3 W., on the east bank of Little River at its confluence with the Umpqua, underneath the bridge at that point.

Named for its occurrence in the Eocene of Oregon.

SIPHONALIA CLARKI, new species.

Plate 11, figures 4a and 4b.

Shell fusiform, with high spire; nine whorls; spire-whorls distinctly shouldered and decorated by about nine rounded nodes which exhibit two apices where two strong spiral lines cross them; space between appressed wavy suture and shoulder concave, and covered by about ten spiral threads; flat space below the suture marked by two strong spiral lines and by eight to ten spiral threads, this area parallel to the axis of the shell;

shoulder located one-third of a whorl length below the suture; body-whorl marked by nodes which vary in strength with different individuals, and shouldered about one-sixth of a whorl-length below the suture; concave space between the suture and the shoulder marked by about twelve spiral threads; area below the shoulder marked by spiral lines of variable strength and by a flat-bottomed sulcus located half the whorl-length below the shoulder; outer lip thin, dentate and liriate within; inner lip covered by a thin callus; umbilicus subimperforate; canal short, twisted to the left.

Dimensions: Length of figured specimens, 40mm; width of body-whorl, 17mm.

This species is easily distinguished from *S. sutterensis* Dickerson, with which it is associated, by its greater length, by its more pronounced spiral ribbing, and by its greater nodosity.

Type:—No. 247, Cal. Acad. Sci. Locality 25, Roseburg Quadrangle, Oregon, near the center of Sec. 19, T. 26 S., R. 3 W., on the east bank of Little River at its confluence with the Umpqua, underneath the bridge at that point. Coll., F. M. Anderson and Bruce Martin.

Named for Dr. Bruce Clark, Instructor in Invertebrate Paleontology, University of California.

PSEUDOLIVA DILLERI, new species.

Plate 12, figures 1a, 1b, 1c, 1d.

Shell biconical; whorls five; spire of moderate height, with conical nodose whorls; suture wavy, indistinct, and bordered by a nodose rim on the succeeding whorl; body-whorl marked by two angulations, both being nodose, but the lower one the stronger; a nearly flat, narrow horizontal space just below the suture rim, this area marked, in addition to spiral lines, by the backward bending lines which mark the former position of a sharp V-shaped posterior sinus; a slightly nodose shoulder terminating this narrow shelf of the body-whorl; from this shoulder the shelf sloping downward to a point a third the length of the body-whorl where another occurs; this second angulation ornamented by prominent rounded tubercles about twelve in number; space between this angulation and the end of the short, slightly-twisted canal marked in its midportion by a deeply impressed groove and by numerous fine spiral lines; a

persistent ribbon-like band, much wider than the space between these spiral lines, about half-way between the tuberculated shoulder and the median groove. This line occurs on most specimens.

Dimensions: Length, 34mm; width of body-whorl, 29mm.

This species can be distinguished from *Pseudoliva volutaformis* Gabb by its greater number of nodes, by the double angulation of the body-whorl, and by the greater strength and abundance of its spiral lines. The spiral lines of this species resemble those of *P. lineata* Gabb, but they are stronger and larger; the tuberculations, however, make it easily distinguishable. This form appears to have been evolved from *P. lineata*.

Type:—No. 248, and cotype, No. 249, Cal. Acad. Sci. Locality 25, Roseburg Quadrangle, Oregon, on Little River at its confluence with the Umpqua, underneath the bridge at that point. Coll., Bruce Martin.

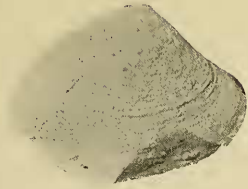
Named in honor of Professor J. S. Diller of the U. S. Geological Survey, whose mapping of the Roseburg Quadrangle made the zonal connection between the Eocene of Oregon and California possible.



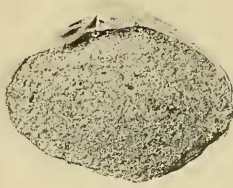


## EXPLANATION OF PLATE 11.

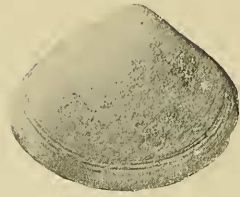
- Fig. 1a. *Venericardia planicosta merriami*, new subspecies, x1. This form in the adult lacks the marked radial ribbing of the typical *V. planicosta*. The type specimen which is figured is an extreme case of this lack of radial ribbing. Other adult individuals associated with it show obscure ribs in the umbonal region. A very characteristic form of the *Siphonalia sutterensis* Zone.
- Fig. 1b. *Venericardia planicosta merriami*, new subspecies, x1. This is a figure of a young individual which shows about the same type of ribbing as *V. planicosta hornii* (Gabb), its probable progenitor.
- Fig. 2a. *Pitaria martini*, new species, x1. A side view of the type specimen.
- Fig. 2b. *Pitaria martini*, new species, x1. Side view of a smaller specimen than the type.
- Fig. 2c. *Pitaria martini*, new species, x1. View showing hinge of same specimen as Fig. 2b.
- Fig. 3a. *Tivela weaveri*, new species, x1. Side view.
- Fig. 3b. *Tivela weaveri*, new species, x1. View showing hinge.
- Fig. 3c. *Tivela weaveri*, new species, x1. Side view of smaller specimen than the type.
- Fig. 4a. *Siphonalia clarki*, new species, x1. Mouth view.
- Fig. 4b. *Siphonalia clarki*, new species, x1. Back view.
- Fig. 5a. *Cerithiopsis oregonensis*, new species, x2. View showing mouth.
- Fig. 5b. *Cerithiopsis oregonensis*, new species, x2. Back view.



2b



2c



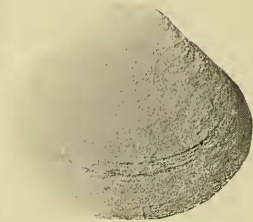
3c



2a



3b



3a



5b



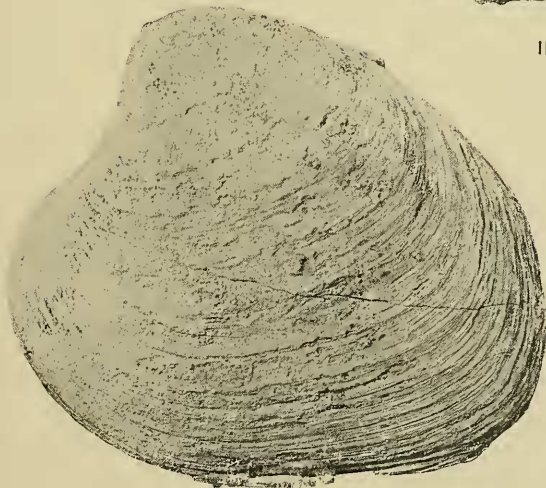
5a



1b



4a



1a



4b

